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Forest Insect And Disease Management

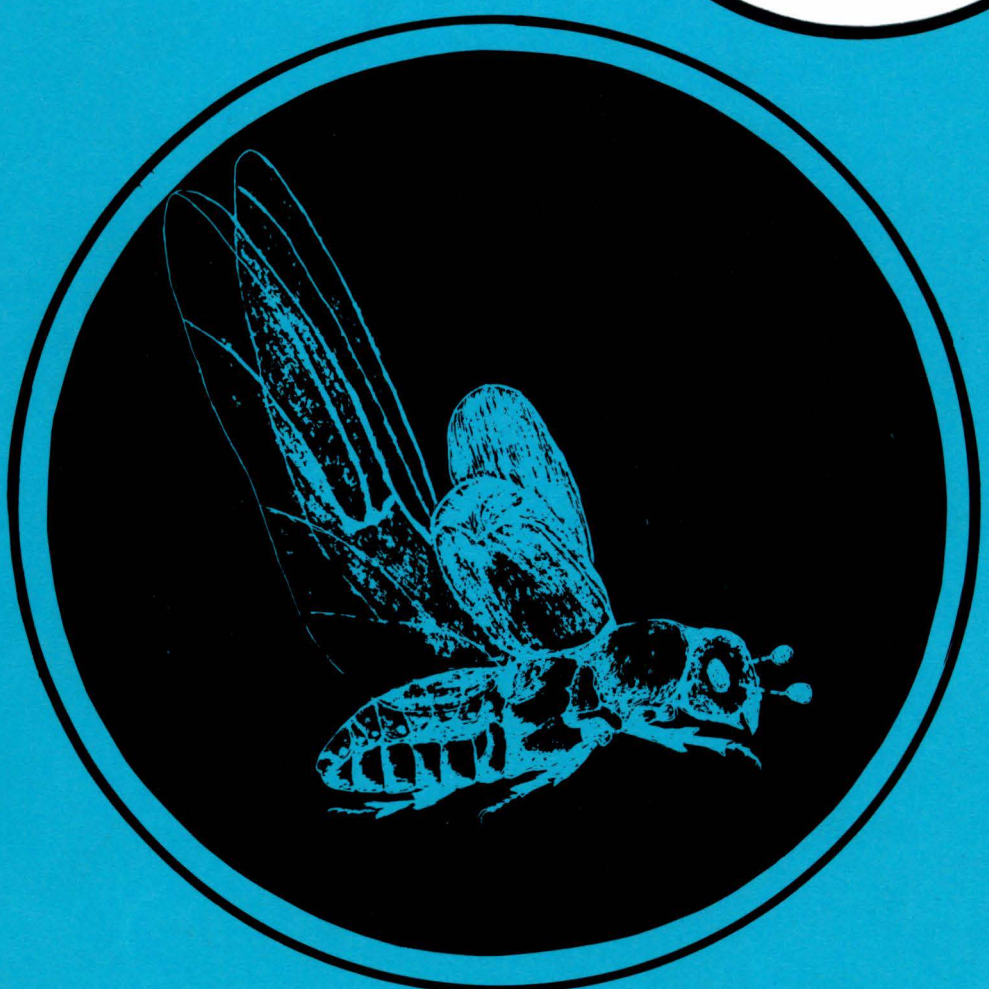
SUPPLEMENT:

SPRUCE BEETLE
RISK RATING SYSTEM
FOR WHITE SPRUCE
ON THE KENAI PENINSULA

CHUGACH NATIONAL FOREST

Technical Report R10-3

October 1979



U.S. Department of Agriculture
State and Private Forestry

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SPRUCE BEETLE RISK RATING SYSTEM FOR WHITE SPRUCE ON THE KENAI PENINSULA

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INTRODUCTION

In January 1979, a spruce beetle (*Dendroctonus rufipennis* Kby.) risk rating system was developed for Alaska's southcentral white spruce forests (*Picea glauca* [Moench] Voss.) occuring on the Chugach National Forest (Holsten and Wolfe 1979). The risk rating system was based on Average Diameter, Stand Age, Stand Condition and Proportion of White Spruce in the canopy. Each stand that was initially rated as high or medium-high risk was double checked according to stand location. Stands located in the Cook Inlet Basin have a higher spruce beetle risk than white spruce stands influenced by the maritime conditions of Prince William Sound. Seventeen out of 59 high and medium-high risked stands had their ratings lowered. These stands are located near Seward.

Alaska spruce beetle populations have dramatically increased in 1979 (Anon. 1979). The 1979 infestations covered approximately 150,000 hectares, an increase of 100,000 hectares over the area infested in 1978. White spruce mortality is occurring on 12,286 hectares of the Chugach National Forest; an increase of 6,085 hectares (50 percent) over the area infested in 1978.

OBJECTIVE

The principal objective of this paper is to report the results of ground checks and aerial surveys of the medium-high and high risk white spruce stands for beetle activity and to discuss the operability of the risk rating system.

MATERIALS AND METHODS

In the summer of 1979, 69 medium-high and high risk stands were checked for beetle activity (Fig. 1A, B). Sixteen and 53 stands were ground checked and aerially surveyed, respectively. A good visible indication of bark beetle activity is the appearance of "faders" (e.g. trees which have been recently killed by bark beetles and the healthy green foliage has faded to a red-orange). The appearance of five or more "faders" per stand was classified as a stand with an active, and potentially destructive, spruce beetle population. All spruce beetle spots, as well as all medium-high and high risk white spruce stands occurring on the Chugach National Forest were mapped on U.S.G.S. 1:250,000 Quadrangle (Seward).

RESULTS AND DISCUSSION

Twelve (7 percent) of the 69 surveyed medium-high and high risk stands had visibly apparent bark beetle activity (Fig. 1A, B, App. A). In fact, many of the stands (e.g. Resurrection Creek) have been infested for three or more years. However, approximately twenty of the 69 stands are located between the southern end of Kenai Lake and the town of Seward (Fig. 1B). These stands are subject to a maritime influence which tends to prevent spruce beetle buildups. Taking this into consideration, 24 percent of the Cook Inlet Basin area's medium-high and high risk stands are currently under attack. Considering the increase in spruce beetle populations during the past two years, there is a good possibility that an additional 24 percent or more will come under attack next year. Specifically, stands 1-4 (Fig. 1A) (Indian Creek) are in close proximity to a large spruce

beetle outbreak a few miles to the west (Barabara Lake). Likewise, stands 5-9 (Fig. 1A) (near Hope) possibily will become infested as the Resurrection Creek outbreak has intensified and spread over 1978 levels.

CONCLUSIONS

As depicted in Fig's. 1A and 1B, spruce beetle outbreaks are occurring throughout the Chugach National Forest. Many of the medium-high to high risk stands are in close proximity to outbreaks or are themselves in outbreak condition. It appears that the risk rating system is valid to a certain degree. However, some of the ongoing outbreaks are occurring in stands that were not included in the risk-rating system or were originally given a low to low-medium risk. A good case in point is the Summit Lake outbreak. The spruce stands in this area were not incorporated into the risk rating system as no stand data was available. They were originally classified, more than ten years ago, as scrub ($\leq$10,000 b.f./acre). That is, they were considered "un-productive", timber-wise.

In order to more effectively revise and improve the current risk rating system, two types of input are needed:

1. Better information concerning cause-effect relations between spruce beetle populations and host condition.
2. Better stand inventory data (e.g. basal area, productivity, etc.)

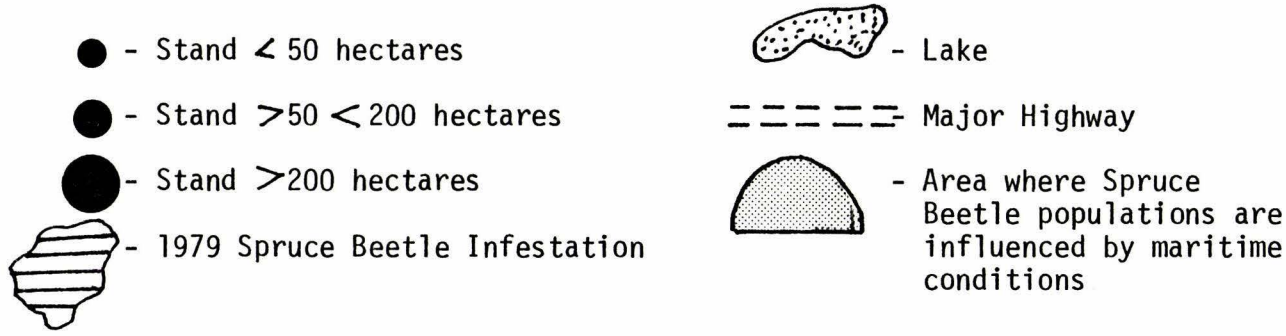
Forest Insect and Disease Management is currently engaged in a 3-year cooperative project with the University of California at Berkeley to provide the

information stated in Number 1. It is hoped that the stand inventory data will be available during the same time frame.

In the meantime, land manager(s) are faced with increasing and damaging spruce beetle populations. There are a number of control options available, including: pesticides, trap trees, fall and burn infested logs, thinning the residual stand and doing nothing. A discussion of these options as well as management implications is found in Averill (1978). The intent of the risk rating system is to identify the outbreak potential of each unmanaged white spruce stand rather than to tell the manager how to manage (Schmid and Frye 1976). It is the manager's decision whether to harvest or not, but he does so realizing that many stands are carried under high risk.

Figure 1 A, B.: Medium high and high risk white spruce stands as well as current spruce beetle infestations in the Chugach National Forest; based on the U.S.G.S. 1:250,000 Quadrangle (Seward).

LEGEND:



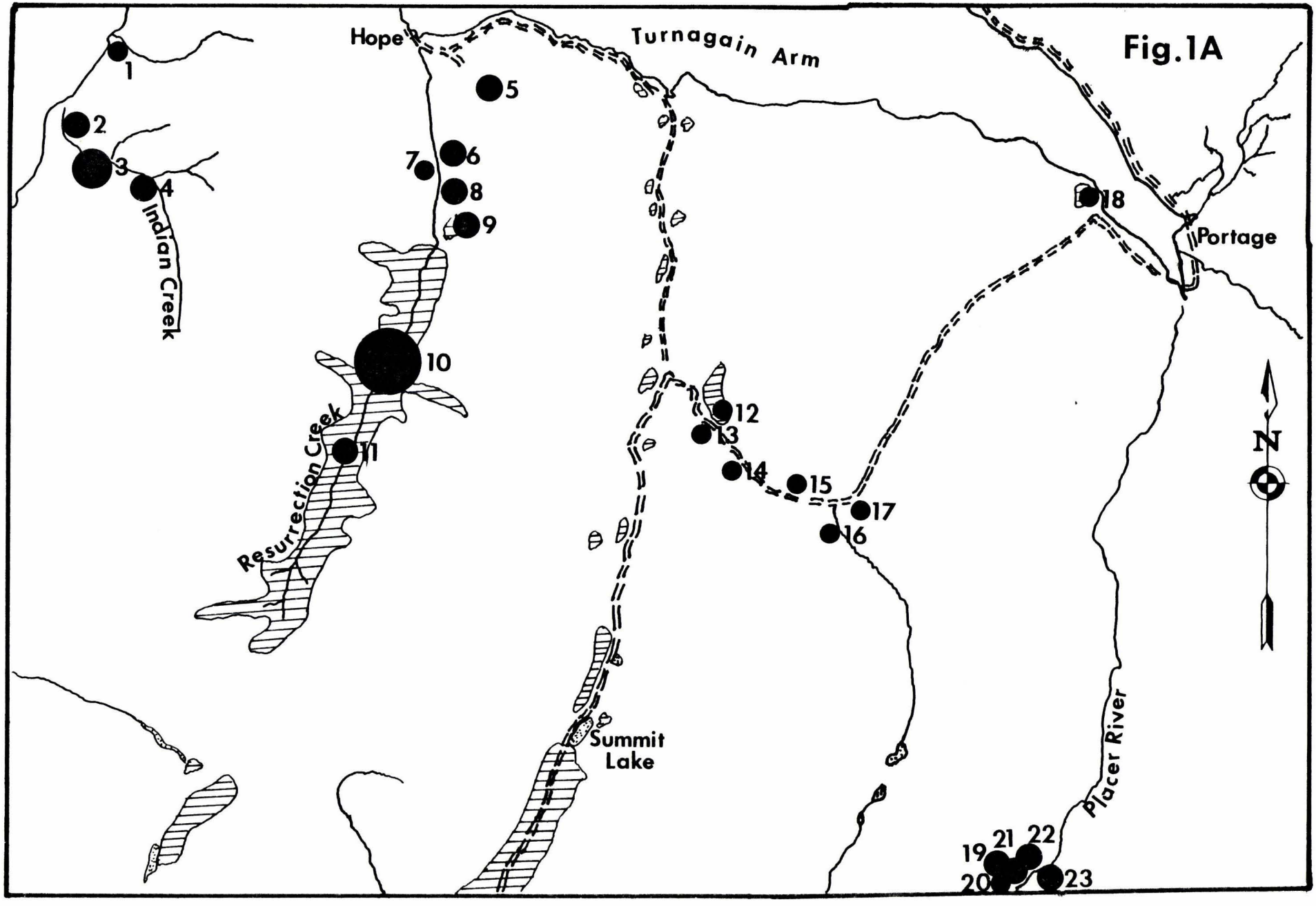


Fig.1A
Hope
Turnagain Arm
Indian Creek
Resurrection Creek
Summit Lake
Portage
Placer River
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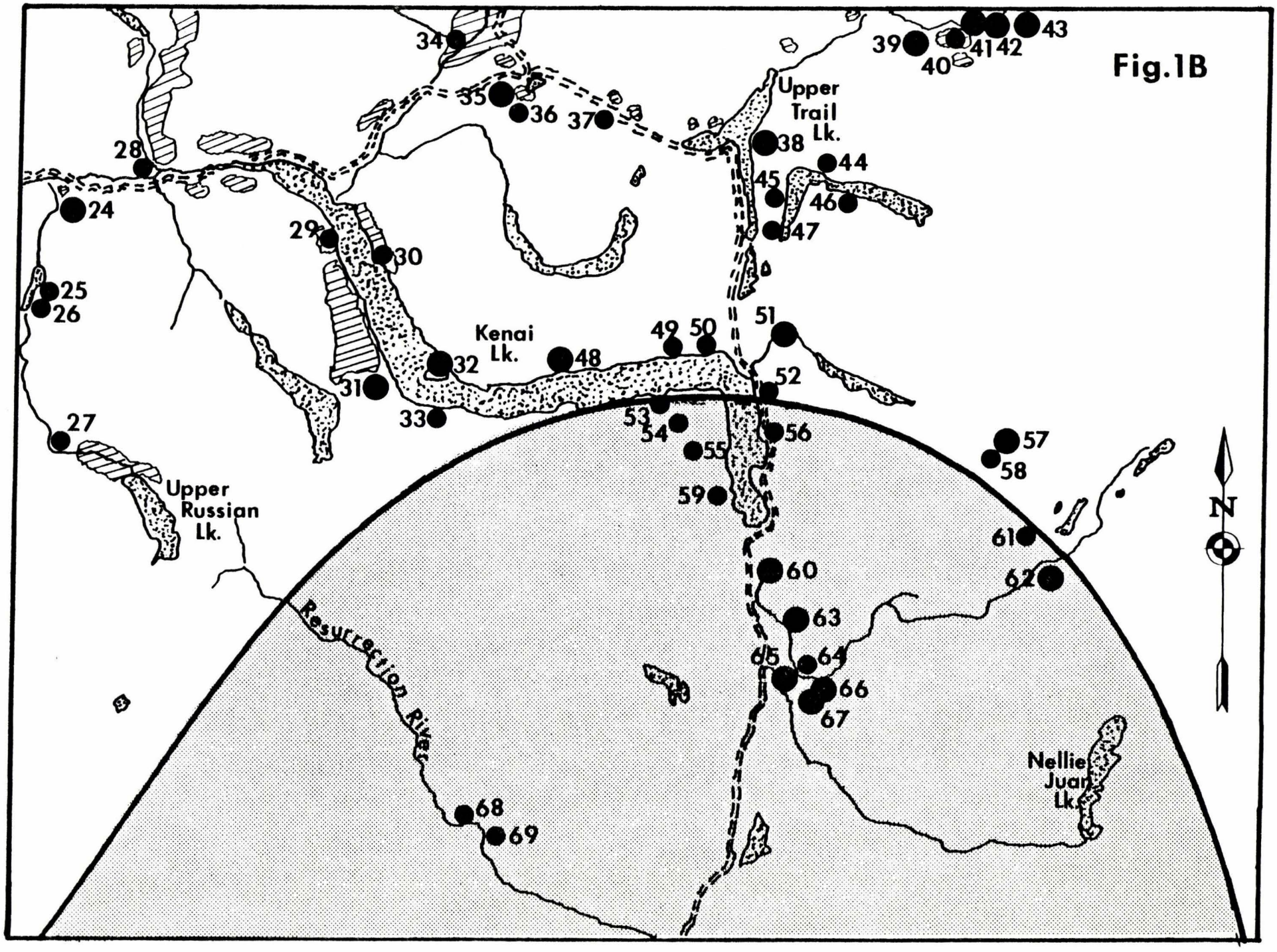
Fig.1B
Upper Trail Lk.
Kenai Lk.
Upper Russian Lk.
Resurrection River
Nellie Juan Lk.
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APPENDIX A. List of Medium-High and High Risk White Spruce Stands located on the Chugach National Forest.

MAP NO.	C.A. & STAND NO.	RISK	MAP NO.	C.A. & STAND NO.	RISK
1	CA1-11	High	24	CA4-2	Med-High
2	CA1-2	Med-High	25	CA5-15	High
3	CA2-6	Med-High	26	CA5-13	High
4	CA2-2	High	27	CA5-11	High
5	CA12-31	High	28	CA4-9	High
6	CA13-11	High	29	CA7-15	Med-High
7	CA12-8	High	30	CA7-45	Med-High
8	CA13-5	High	31	CA6-4	Med-High
9	CA13-2	High	32	CA7-49	Med
10	CA11-2	High	33	CA7-1	High
11	CA11-1	High	34	CA18-1	Med-High
12	CA7-15	Med-High	35	CA18-66	High
13	CA15-12	High	36	CA18-65	High
14	CA1-20	High	37	CA18-67	High
15	CA31-25	High	38	CA27-45	High
16	CA31-34	Med-High	39	CA28-6	High
17	CA31-32	High	40	CA28-9	High
18	CA32-9	High	41	CA28-10	High
19	CA28-18	High	42	CA28-13	Med-High
20	CA28-16	Med-High	43	CA28-28	High
21	CA28-19	High	44	CA26-46	High
22	CA28-25	High	45	CA26-50	High
23	CA28-22	High	46	CA26-47	High

MAP NUMBER	C.A. & STAND NUMBER	RISK
47	CA26-49	High
48	CA7-69	High
49	CA7-65	High
50	CA7-64	High
51	CA7-36	High
52	CA7-34	High
53	CA7-26	High
54	CA7-25	High
55	CA7-24	High
56	CA7-33	High
57	CA25-1	High
58	CA25-5	High
59	CA7-23	High
60	CA23-27	High
61	CA24-1	High
62	CA24-7	High
63	CA23-19	High
64	CA23-16	High
65	CA23-12	Med-High
66	CA23-9	High
67	CA23-10	High
68	CA7-35	High
69	CA7-39	High

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